HISTORY and CONSTRUCTION

of

THE CARROLLTON VIADUCT

by

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--:-SUMMARY-:--

This paper while primarily intended to give a "History and Construction of Carrollton Viaduct" over Gwynn's Falls at Mount Clare, Maryland, by way of introduction includes the inception of a railroad, a few facts concerning its founders and early engineers, reason for the road passing over Gwynn's Falls, and other information about the Baltimore and Ohio Railroad up to the time Carrollton Viaduct was completed in 1829.

Actual drawings are omitted because as far as the author has been able to ascertain none are available, the Baltimore and Ohio having lost all of their records in the Baltimore fire.

Photos are included showing the rock foundation, state of preservation of the structure, a modern locomotive passing over it, and views in the immediate vicinity.

This paper is respectfully dedicated to the early Engineers of the Baltimore and Ohio Railroad, pioneers in a work which redounds to the everlasting honor of the state of Maryland, and reflects immortal credit upon the intelligence, perseverance and unflagging energy of those who originated, perfected, and have carried to a successful issue this great national enterprise.

CARROLLTON VIADUCT

BALTIMORE'S ECONOMIC POSITION 1826.

Towards the end of the first quarter of the 19th. Century Baltimore was confronted by the important economic problem, how to retain its rank as a prominent commercial emporium of the United States. Although the growth of the country beyond the Alleghanies had not been anticipated everybody felt that there were good things in store there and New York, Philadelphia, Boston and Baltimore all essayed to grasp them. New York had her Erie Canal completed in 1825, which aimed at flanking the mountains in the country of the Great Lakes. Philadelphia bravely attacked them in front; Boston watched for a place to pass them. At that time railroads were unthought of. Canals were the means relied on. Baltimore had a hope of constructing a canal looking toward the setting sun, but the report pf General Bernard proved that a project in this direction was impracticable, except at a cost infinitely beyond the means of the city, and then the people may be said to have sat down, like the Israelites of old, by the waters of Babylon, and wept.

When Layfayette visited the city in 1824 and was received with gorgeous hospitality there was a general

feeling that this threatened to be the fitful flash of the last remnant of Baltimore's enterprise, before its light and warmth were finally extinguished.

THE FOUNDERS OF THE B&O.

Just about this time, however, railroads were first spoken of. Evan Thomas of Baltimore was in England, where he collected many valuable facts relative to the operations he had witnessed on the short industrial railroads in the mineral districts of Great Britain. This important information he forwarded to his brother Philip E. Thomas of Baltimore as did likewise William Brown, a member of parliament, to his brother George Brown. These documents having been compared Mr. Thomas and Mr. Brown were both fully convinced that a Rail Road could be opened between Baltimore and Western waters, and that the future commercial growth of their city lay in its early consummation.

John H.B. Latrobe in his lecture, "Personal Recollections of the Baltimore and Ohio Rail Road," describes Mr. Evan Thomas as "a man of active nervous temperament, of great fluency in speech, of active intellect, full of all sorts of information and respected for sterling qualities of heart and head, he talked railroad wherever he could find, or force a listener." Although he seems not to have been a man to lead in any undertaking he must have been the man of all men to urge others to be leaders. His brother Philip while lacking this impulsiveness was a man noted for his clearness of

could be cut like cheese, to win a costly experience in the hard granite districts of Maryland. To these were added Engineers of the United States Army. A mission of Engineers were sent to England to study the short roads that had been established for mining purposes.

Even with the best skill in the country at work, the vaguest ideas prevailed as may be seen by relating a scheme suggested by the Engineers for crossing the mountains. (T.H. B.La Trobe). A double track of road was to be constructed up and down them, as straight as an arrow; care being taken that the upper end of one of the tracks should be close to a stream, which was to be used to fill water cars, whose weight, as they decended on one track, was to drag up the passenger and burden cars on the other, the two trains being connected by a rope passing around a pulley at the summit. At the bottom of the mountain the water cars were to be emptied; but the engineer had forgotten to provide a way for getting them back to the top for the next trip." That there would probably be a want of water for any purpose on the crest of the Alleghanies, never seems to have entered the head of these distinguished men. The mountains were still so far off, however, that this notion did no harm and was laid aside and heard of no more.

REASON FOR LOCATION.

While this may seem absurd, no less so is the ruling which caused the line to come in where Mount Clare Station

now stands. One might well ask now why the company made the great embankment west of Mount Clare; why it built the costly structure of hewn granite, the Carrollton Viaduct. The reason is given by Latrobe, the Chief Engineer. The conscript fathers of the city so ordained in their utter ignorance that the road was to be located at an elevation of 66 feet above tide and the company was too poor to make any efficient resistence to an ineffable absurdity to which the three wise men of Gotham affords the nearest parallel.

So here on the 66 feet grade was laid the corner stone on the 4th of July, 1828. The Baltimore American of July 7th, 1828 says,"the ceremonies attending the commencement of the Baltimore and Ohio Rail Road brought to town a great concourse of strangers." They make an estimate of 50,000 spectators and added" among the whole, we are happy to say, we witnessed a quietness and good order seldom seen in so immense a multitude." It then pays tribute to the venerable Charles Carroll of Carrollton who layed the corner stone and goes on to give a description of the "grand civic procession."

In line were,farmers, and planters, gardeners, millers, bakers, tailors, blacksmiths, weavers, carpenters, stonecutters, painters, tanners, hatters, harness makers, bookbinders, jewelers, rope-makers, ship captains, printers, and many civic associations.

ATTITUDE OF THE PUBLIC.

Little wonder that the Citizens'and Farmers' Almanac

of 1831, published in Hagerstown introduces one of its stories in this wise "----with a belief that the progress of the Baltimore and Ohio Rail Road is an object of curiosity and interest to very many readers, we now proceed to lay before them a description of the same as contained in a letter from De Witt Clinton, Civil Engineer, of New York, who visited it shortly after the commencement of travel thereon from Baltimore to Ellicotts, (now Ellicotts City) and a description of the most prominent structure on it, the Carrollton Viaduct, over Gwynn's Falls in the vicinity of Baltimore."

CARROLLTON VIADUCT.

THE letter is dated in Baltimore, June 2, 1830, and several interesting excerpts concerning the Carrollton Viaduct are given. Clinton states that "the Carrollton Viaduct does much credit to its projectors, and will rank with any masonry in this country, or in Europe." "Moving on the traveller finds himself on the level summit of the ground which overlooks and forms the eastern bank of Gwynn's Falls. The road approaches the stream at right angles, and is carried over it by an immense structure of dressed granite, designed by Casper W. Weaver, and executed by James Lloyd, one of the most enterprising and skillful bridge architects of the country. It is a work for which the extent, solidity, beauty, and grandeur, has not we believe its equal in the country."

CONSTRUCTION DETAILS.

The viaduct is named after Charles Carroll of Carrollton, the last surviving signer of the Declaration of Independence. He was over ninety years of age when with fitting ceremonies he laid the corner stone of this structure.

Records of the Carrollton Viaduct during the period of construction are entirely lacking and none of the designs or working drawings are available. Unfortunately all papers in reference to the design, showing stresses which the engineers planned the viaduct to carry, the specifications, the cost, the officials letting the contract and other matters of interest were lost in the Baltimore fire.

It has been definatley established that this structure is the oldest railroad viaduct in United States. The Erie has challenged this statement of the Baltimore and Ohio, but as Mr. Richard Mather, District Engineer of the Baltimore and Ohio says,"They're right and they're wrong." The Carrollton Viaduct was completed in 1829 and ~~now~~ over it passed upon a regular schedule horse-drawn cars. At this time the road did not contemplate the use of steam and before locomotives were adopted as equipment in 1833 the Erie built the Starrucca Viaduct near Susquehanna and tried out locomotives over this structure in 1832, the Carrollton Viaduct having been in use ~~only~~ nearly three years.

The Baltimore and Ohio Magazine for October 1921 quotes from the Railway Age Gazette published in 1917 some inter-

esting construction details disclosed by recent repairs on this old stone Arch Bridge which indicate the skill and ingenuity of the bridge masons of nearly a Century ago. "The structure is 297 feet long, with a central arch of 80 feet span, and with the base of the rails 65 feet, 6 inches above the bed of the stream. Large pilasters were placed on the side walls and extend to about 4 feet above the original elevation of the railroad tracks, to form parapets. The spandrel spaces over the arches are not filled, but the track load is supported on a system of longitudinal and tranverse 12 inch brick walls, resting in the arch rings. These walls are spaced 3 feet center to center transversely and 5 feet longitudinally, and covered with 12 inch Maryland granite slabs, which in turn hold the ballast under the tracks.

It was originally constructed for double track, and although the equipment it was designed to carry, undoubtedly weighed less than a light truck, it has remained in perfect condition under the continually increasing loads, until it is now carrying as heavy loads and traffic as any bridge in the country.

No repairs would have been necessary in the recent past had not the common practice of raising the track at intervals, when applying new ballast, brought the rails up to the level of the top of the parapet walls, and placed a heavy lateral thrust upon them, which they were not designed

to carry. This caused the spandrel walls to move to such an extent that it became necessary to take them down to the elevation of the top of the arch, and in some places, still lower, and to reset them, backing them up with concrete under the track a sufficient distance to take the thrust from the parapet walls. In handling this work, special care was taken to replace the stones in their former position, in order to preserve the originality of the old bridge as far as possible.

ORIGINAL PLANS, COST.

It is thought that the original plans called for two arches of 40 feet span, but to please the owner of a mill, who was afraid a 40 foot span would dam up the stream the bridge was lengthened to two arches, one of 80 feet, the other of 20 foot span. The shorter span of 20 feet on the west end of the structure was at some time filled and now is not visible. It is estimated that the original structure contained 274,875 cu. ft. of masonry, and the cost when completed was probably $58,000. Comparing records of the date the first rails were laid and the time the first train of cars crossed over Carrollton Viaduct, the period of construction was approximately six months. The ease with which stone was procured from the quarries of the Patapsco on the line of the railroad did much to moderate the expense of construction.

SPECIFICATIONS.

The only specification that the author has been able to find, reads: "No ardent spirits are to be kept or used near the work." Mr. Casper Wever, the Superintendent of Construction and designer of the Carrollton Viaduct states in one of his early reports: "It is believed that the work may be executed without the use of the dreadful poison, more advantageously to the interest of the Company, and certainly more agreeably to its officers and contractors. The promised good which prohibition holds out to all parties, requires that the measure shall be persisted in."

REPAIRS.

The initial cost is not only exceedingly low, but the up-keep expenses on the Carrollton Viaduct is a most remarkable feature. After 98 years of continous service under heavy traffic, the up-keep has been negligible.

DURABILITY.

Today, the viaduct looks as strong as it originally was, and the engineers of the Baltimore and Ohio do not anticipate any alternations for many years to come. The structure seems neither to be affected by the elements nor the increasing loads to which it has been subjected. The accompanying views show its splendid state of preservation.

It is not probable that Wever knew of the vast capacity of his viaduct, nor is it likely that in the most imaginative

mood he could have visualized the modern locomotives shown in the accompaning views passing over it. The design of bridges at that time was not the exact science which it is today and in the design of his bridge he had no precedents or rules to follow.

Latrobe says, the engineers were severely criticized for assuming they had the purse of the government and censures them for "extravagance" in using stone arches instead of wooden structures. The wisdom of their work has been fully demonstrated.

That there was a verdant freshness about the railroad things in those days is evident in the account of the reception afforded Mr. Winans, the inventor of the "Winans friction wheel." Before a vast throng in the Exchange, Charles Carroll over ninety years of age, who was the great man on all great occassions in Baltimore, was seated in a little car in one of the upper rooms, the cars being drawn by a ridiculously small weight attached to a small weight hung by a string passing over a pully and dropping into the hall below. Around him were all the prominent men of Baltimore, all as much pleased as children with a new toy.

Equally amusing is the race of the locomotive which was to pass over the Carrollton Viaduct against the stage coach. It was determined to have a race from the Relay House to Mount Clare. The start being made, away went horse and engine, the snort of one and the puff of the

other keeping time and tune. At the first the horse had the best of it, for his steam would be applied to the greatest advantage on the instant, while the Tom Thumb had to wait until the rotation of the wheels set the blower to work. The horse is said to have been a quarter of a mile ahead when the safety valve of the engine lifted and the issuing vapor showed an excess of steam. The blower whistled, the steam blew off, the pace increased, the passengers shouted, the engine gained on the horse, soon it lapped him ---the race was neck and neck, the engine passed the horse and up went a mighty shout of victory. But the joy was of short duration. The band driving the blower slipped, the safety valve began to scream, and the engine for want of breath began to wheeze and pant. In vain Cooper tried to urge his locomotive on, and although he did get it to take its second wind, the horse overtook him and won. Perhaps the explanation may lie in the fact that while the horse drank and chewed he did'nt smoke.

For such contraptions as these was Carrollton Viaduct designed, yet today it still carries the heaviest locomotives.

During the Civil War the structure was in serious danger of being destroyed, but it came through unharmed, and judging from its present condition will continue to serve indefinitely.

Carrollton Viaduct, the first great structure on the

first railroad in the world is a proud monument to the genius of its builder, James Lloyd and all those engineers who with an unflagging purpose. through years of gloom, sacrifice, labor, and patient effort brought to accomplishment the sublime conception.

Baltimore and Ohio Magazine

Carrollton Viaduct
Baltimore and Ohio Railroad
Built in 1829

October, 1921

The Cover Picture-The Carrollton Viaduct

Built for the Baltimore and Ohio Railroad in 1829

Photograph by B. Hyanes, through the courtesy of
D. A. Williams, Assistant to Purchasing Agent

The *Citizens' and Farmers' Almanac* of 1831, published in Hagerstown, Md., introduces one of its stories in this wise:

"—with a belief that the progress of the Baltimore and Ohio Railroad is an object of curiosity and interest to very many of our readers, we now proceed to lay before them a description of the same as contained in a letter from De Witt Clinton, Esq., Civil Engineer, of New York, who visited it shortly after the commencement of travel thereon from Baltimore to Ellicotts, and an Engraved View and description of the most prominent Structure occurring on it, viz.: THE CARROLLTON VIADUCT over Gywnn's Falls in the vicinity of Baltimore."

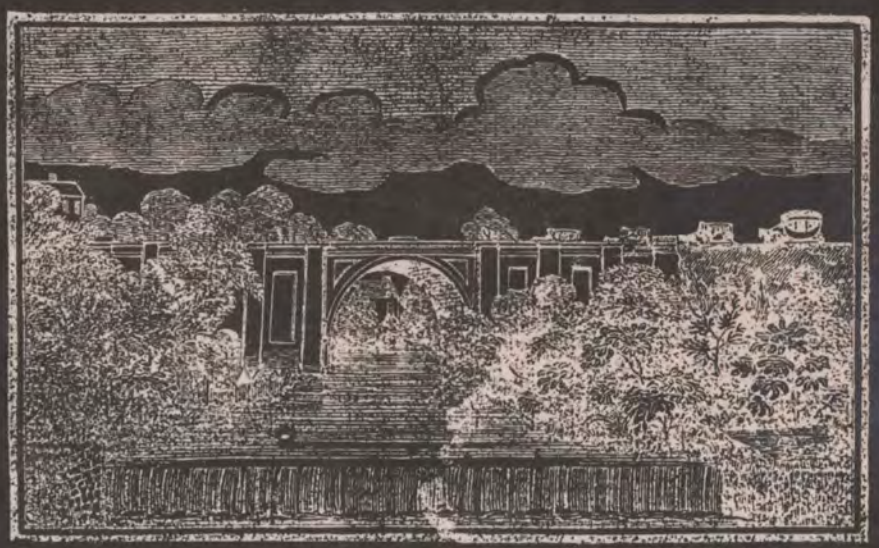
The letter is dated in Baltimore, June 2d, 1830, and we quote from it interesting excerpts concerning the Carrollton Viaduct, viz.:

"The Carrollton and Patapsco viaducts do much credit to their projectors, and will rank with any masonry in this country, or in Europe." * * * *

"Moving onward, the traveller finds himself on the level summit of the ground which overlooks and forms the eastern bank of Gwynn's Falls. The Road approaches the stream at right angles, and is carried over it by an immense structure of dressed in granite, designed by CASPER W. WEAVER, Esq., and executed by JAMES LLOYD, Esq., one of the most enterprising and skillful bridge architects of the country, called in honor of the illustrious individual who laid the First Stone,

THE CARROLLTON VIADUCT,

a work for which the extent, solidity, beauty, and even grandeur, has not, we believe, its equal in this country."



Wood cut of Carrollton Viaduct appearing in the *Citizens' and Farmers' Almanac* of 1831.
Note the "horse cars" on the track

Lack of space prevents reprinting of more of this interesting letter, so we conclude with the following information concerning the viaduct furnished to the Railway Age Gazette in 1917 by S. C. Tanner, now superintendent of shops at Martinsburg:

Repairs recently made on the old stone Arch Bridge disclose some interesting construction details that indicated the skill and ingenuity of the bridge masons of nearly a century ago. The structure is 297 feet long, with a central arch with an 80 foot span, and with the base of the rails 65 feet, 6 inches above the bed of the stream. Large pilasters were placed on the side walls and extend to about 4 feet above the original elevation of the railroad tracks, to form parapets. The spandrel spaces over the arches are not filled, but the track load is supported on a system of longitudinal and transverse 12 inch brick walls, resting in the arch rings. These walls are spaced 3 feet center to center, transversely, and 5 feet longitudinally, and are covered with 12 inch granite slabs, which, in turn, hold the ballast under the tracks.

It was originally constructed for double track, and although the equipment it was designed to carry, undoubtedly weighed less than the present day automobile truck, it has remained in perfect condition under the continually increasing loads, until it is now carrying as heavy loads and traffic as any bridge in the country. No repairs would have been necessary in the recent past had not the common practice of raising the track at intervals, when applying new ballast, brought the rails up to the level of the top of the parapet walls, and placed a heavy lateral thrust upon them, which they were not designed to carry. This caused the spandrel walls to move to such an extent that it became necessary to take them down to the elevation of the top of the arch, and in some places, still lower, and to reset them, backing them up with concrete under the track a sufficient distance to take the thrust from the parapet walls. In handling this work, special care was taken to replace the stones in their former position, in order to preserve the originality of the old bridge as far as possible.

The structure was in serious danger of destruction during the Civil War, but by careful guarding it came through unharmed, and judging from its present condition, it will continue to serve indefinitely.

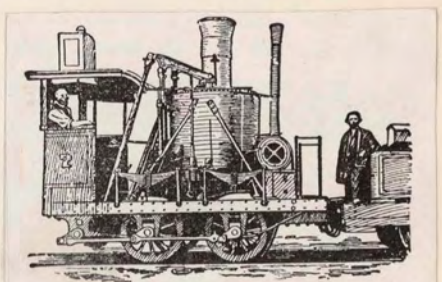
VIEWS TAKEN AT THE BASE SHOWING WELL PRESERVED CONDITION OF MASONRY.

VIEWS TAKEN AT THE BASE SHOWING WELL PRESERVED CONDITION OF MASONRY.

CORNER STONE.
laid by
Charles Carroll
of
Carrollton.

JAMES LLOYD
of Md. Builder
AD. 1829.

1927.



FIRST LOCOMOTIVE, BALTIMORE & OHIO RAILROAD.

Tom Thumb

1830

Signal Tower
at the viaduct

Board Walk and
Railing Placed over
the structure 8 years
ago.

Tracks of The Western Maryland passing under the Baltimore and Ohio immediately south of Carrollton Viaduct.

Carrollton Viaduct with a modern load passing over it.

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